

# 2
OIPE

RAW SEQUENCE LISTING
PATENT APPLICATION: US/10/022,249

DATE: 02/05/2002
TIME: 14:19:13

Input Set : N:\jumbos\022249
Output Set: N:\CRF3\02052002\J022249.raw

4 <110> APPLICANT: Vega, Manuel
5 Drittanti, Lila
7 <120> TITLE OF INVENTION: HIGH THROUGHPUT DIRECTED EVOLUTION BY RATIONAL MUTAGENESIS
9 <130> FILE REFERENCE: 37851-911
C--> 11 <140> CURRENT APPLICATION NUMBER: US/10/022,249
C--> 12 <141> CURRENT FILING DATE: 2001-12-17
14 <150> PRIOR APPLICATION NUMBER: 60/315,382
15 <151> PRIOR FILING DATE: 2001-08-27
17 <160> NUMBER OF SEQ ID NOS: 735
19 <170> SOFTWARE: FastSEQ for Windows Version 4.0
21 <210> SEQ ID NO: 1
22 <211> LENGTH: 621
23 <212> TYPE: PRT
24 <213> ORGANISM: Artificial Sequence
26 <220> FEATURE:
27 <223> OTHER INFORMATION: Mutant rep protein: rep78 4 GCT
29 <400> SEQUENCE: 1
30 Thr Ala Gly Ala Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
31 1 5 10 15
32 Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
33 20 25 30
34 Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
35 35 40 45
36 Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
37 50 55 60
38 Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
39 65 70 75 80
40 Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
41 85 90 95
42 Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
43 100 105 110
44 Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
45 115 120 125
46 Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly
47 130 135 140
48 Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
49 145 150 155 160
50 Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
51 165 170 175
52 Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
53 180 185 190
54 Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
55 195 200 205

ENTERED

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56 Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
57 210 215 220
58 Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
59 225 230 235 240
60 Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
61 245 250 255
62 Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
63 260 265 270
64 Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
65 275 280 285
66 Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
67 290 295 300
68 Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
69 305 310 315 320
70 Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
71 325 330 335
72 Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
73 340 345 350
74 Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
75 355 360 365
76 Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
77 370 375 380
78 Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
79 385 390 395 400
80 Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
81 405 410 415
82 Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
83 420 425 430
84 Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
85 435 440 445
86 Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
87 450 455 460
88 Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
89 465 470 475 480
90 Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
91 485 490 495
92 Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
93 500 505 510
94 Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
95 515 520 525
96 Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
97 530 535 540
98 Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
99 545 550 555 560
100 Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
101 565 570 575
102 Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
103 580 585 590
104 Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp

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105 595 600 605
106 Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
107 610 615 620
109 <210> SEQ ID NO: 2
110 <211> LENGTH: 536
111 <212> TYPE: PRT
112 <213> ORGANISM: Artificial Sequence
114 <220> FEATURE:
115 <223> OTHER INFORMATION: Mutant rep protein: rep68 4 GCT
117 <400> SEQUENCE: 2
118 Thr Ala Gly Ala Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
119 1 5 10 15
120 Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
121 20 25 30
122 Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
123 35 40 45
124 Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
125 50 55 60
126 Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
127 65 70 75 80
128 Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
129 85 90 95
130 Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
131 100 105 110
132 Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
133 115 120 125
134 Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
135 130 135 140
136 Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
137 145 150 155 160
138 Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
139 165 170 175
140 Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
141 180 185 190
142 Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
143 195 200 205
144 Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
145 210 215 220
146 Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
147 225 230 235 240
148 Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
149 245 250 255
150 Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
151 260 265 270
152 Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
153 275 280 285
154 Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
155 290 295 300
156 Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala

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157	305	310	315	320
158	Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala			
159	325	330	335	
160	Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro			
161	340	345	350	
162	Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp			
163	355	360	365	
164	Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala			
165	370	375	380	
166	Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg			
167	385	390	395	400
168	Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val			
169	405	410	415	
170	Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser			
171	420	425	430	
172	Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe			
173	435	440	445	
174	Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln			
175	450	455	460	
176	Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val			
177	465	470	475	480
178	Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala			
179	485	490	495	
180	Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val			
181	500	505	510	
182	Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp			
183	515	520	525	
184	Arg Leu Ala Arg Gly His Ser Leu			
185	530	535		
187	<210> SEQ ID NO: 3			
188	<211> LENGTH: 621			
189	<212> TYPE: PRT			
190	<213> ORGANISM: Artificial Sequence			
192	<220> FEATURE:			
193	<223> OTHER INFORMATION: Mutant rep protein: rep78 10 GCG			
195	<400> SEQUENCE: 3			
196	Thr Ala Gly Phe Tyr Glu Ile Val Ile Ala Val Pro Ser Asp Leu Asp			
197	1	5	10	15
198	Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu			
199	20	25	30	
200	Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile			
201	35	40	45	
202	Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu			
203	50	55	60	
204	Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val			
205	65	70	75	80
206	Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu			
207	85	90	95	
208	Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile			

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209 100 105 110
210 Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
211 115 120 125
212 Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
213 130 135 140
214 Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
215 145 150 155 160
216 Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
217 165 170 175
218 Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
219 180 185 190
220 Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
221 195 200 205
222 Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
223 210 215 220
224 Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225 225 230 235 240
226 Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
227 245 250 255
228 Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
229 260 265 270
230 Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
231 275 280 285
232 Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
233 290 295 300
234 Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
235 305 310 315 320
236 Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
237 325 330 335
238 Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
239 340 345 350
240 Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
241 355 360 365
242 Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
243 370 375 380
244 Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
245 385 390 395 400
246 Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
247 405 410 415
248 Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
249 420 425 430
250 Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
251 435 440 445
252 Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
253 450 455 460
254 Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
255 465 470 475 480
256 Glu His Glu Phe Tyr Val Lys Lys Gly Ala Lys Lys Arg Pro Ala
257 485 490 495

VERIFICATION SUMMARY DATE: 02/05/2002
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L:11 M:270 C: Current Application Number differs, Replaced Current Application Number
L:12 M:271 C: Current Filing Date differs, Replaced Current Filing Date